

WHAT IS CLAIMED IS:

1. A light-emitting diode package structure, comprising:

an insulating sub-mount having a first surface with a cavity therein;

5 a first patterned conductive-reflective film set up on a portion of the first surface, a first sidewall of the cavity and a bottom surface of the cavity;

a second patterned conductive-reflective film set up on a portion of the first surface, a second sidewall of the cavity and a bottom surface of the cavity; and

10 a light-emitting diode chip set up inside the cavity of the insulating sub-mount, wherein the light-emitting diode has a first electrode and a second electrode electrically connected to the first patterned conductive-reflective film and the second patterned conductive-reflective film.

2. The light-emitting diode package structure of claim 1, wherein the package  
15 further comprises a pair of bumps set up between the first electrode of the light-emitting diode and the first patterned conductive-reflective film as well as the second electrode of the light-emitting diode and the second patterned conductive-reflective film.

3. The light-emitting diode package structure of claim 2, wherein material constituting the bumps comprises lead-tin or Au-Sn alloy or Au.

20 4. The light-emitting diode package structure of claim 1, wherein material constituting the insulating sub-mount is selected from a group consisting of aluminum nitride, silicon, GaAs, SiC, boron nitride, beryllium oxide and zinc oxide.

5. The light-emitting diode package structure of claim 1, wherein the package further comprises a first bonding pad and a second bonding pad set up on the first

patterned conductive-reflective film and the second patterned conductive-reflective film for connecting electrically with an external circuit board.

6. The light-emitting diode package structure of claim 1, wherein the sidewall and the bottom surface of the cavity form an obtuse angle.

5           7. A light-emitting diode package structure, comprising:

                  a semiconductor sub-mount having a first surface with a cavity therein;

                  a first patterned conductive-reflective film set up on a portion of the first surface, a first sidewall of the cavity and a bottom surface of the cavity;

10               a second patterned conductive-reflective film set up on a portion of the first surface, a second sidewall of the cavity and a bottom surface of the cavity; and

                  a light-emitting diode chip set up inside the cavity of the semiconductor sub-mount, wherein the light-emitting diode has a first electrode and a  
15               second electrode electrically connected to the first patterned conductive-reflective film and the second patterned conductive-reflective film.

                  8. The light-emitting diode package structure of claim 7, wherein the package further comprises a pair of bumps set up between the first electrode of the light-emitting diode and the first patterned conductive-reflective film as well as the second electrode  
20               of the light-emitting diode and the second patterned conductive-reflective film.

                  9. The light-emitting diode package structure of claim 8, wherein material constituting the bumps comprises lead-tin, gold-tin alloy or gold.

                  10. The light-emitting diode package structure of claim 7, wherein the package further comprises a first bonding pad and a second bonding pad set up on the first

patterned conductive-reflective film and the second patterned conductive-reflective film for connecting electrically with an external circuit board.

11. The light-emitting diode package structure of claim 7, wherein the sidewall and the bottom surface of the cavity form an obtuse angle.

5           12. The light-emitting diode package structure of claim 7, wherein material constituting the semiconductor sub-mount comprises silicon or gallium arsenide or SiC, zinc oxide.

13. The light-emitting diode package structure of claim 7, wherein the semiconductor sub-mount further comprises:

10                       a first conductive type semiconductor sub-mount, wherein the first conductive type semiconductor sub-mount has a second conductive type region therein; and

                          an insulating layer set up on the first conductive type semiconductor sub-mount, wherein one of the electrodes is electrically connected to the  
15       second conductive type region but electrically isolated from the first conductive type semiconductor sub-mount through the insulating layer.

14. The light-emitting diode package structure of claim 12, wherein the first conductive type semiconductor sub-mount is an N-doped material layer and the second conductive type region is a P-doped material layer.

20           15. The light-emitting diode package structure of claim 12, wherein the first conductive type semiconductor sub-mount is a P-doped material layer and the second conductive type region is an N-doped material layer.